
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.: 481-8546
SRP Section: 16 - Technical Specifications
Application Section: 16.3.4, 16.3.5, 16.3.6, 16.3.7, 16.3.9
Date of RAI Issue: 05/12/2016

Question No. 16-144

Paragraph (a)(11) of 10 CFR 52.47 and paragraph (a)(30) of 10 CFR 52.79 state that a design certification (DC) applicant and a combined license (COL) applicant, respectively, are to propose TS prepared in accordance with 10 CFR 50.36 and 50.36a. 10 CFR 50.36 sets forth requirements for technical specifications to be included as part of the operating license for a nuclear power facility. NUREG-1432, "Standard Technical Specifications-Combustion Engineering Plants," Rev. 4, provides NRC guidance on format and content of technical specifications as one acceptable means to meet 10 CFR 50.36 requirements. Staff needs to evaluate all technical differences from standard TS (STS) NUREG-1432, STS Combustion Engineering Plants, Rev. 4, which is referenced by the DC applicant in DCD Tier 2 Section 16.1, and the docketed rationale for each difference because conformance to STS provisions is used in the safety review as the initial point of guidance for evaluating the adequacy of the generic TS to ensure adequate protection of public health and safety, and the completeness and accuracy of the generic TS Bases.

This request stems from discussion at the February 2016 meeting with the applicant.

The applicant is requested to make the following corrections to generic TS 3.7.11 and Bases:

1. The Note below the Subsection title of Specification 3.7.11, "Control Room HVAC System (CRHS)" is not appropriate for the Specification; put this design detail in the Bases Background section. The inclusion of this Note is not described on STS Deviation Report (DR) page 105. The Note states: "The CRHS consists of two divisions of control room emergency makeup air cleaning system (CREACS) and control room supply and return system (CRSRS)."
2. "HVAC" needs to be defined whenever first used in each Specification and Bases subsection.

3. LCO 3.7.11 in generic TS rev.0 states, "Two CRHS divisions shall be OPERABLE." But DR page 106 quotes LCO 3.7.11 as "The CRHS shall be OPERABLE with : a. *Two CREACS divisions OPERABLE*; and b. Two AHUs in two CRSRS divisions OPERABLE." (Text in italics is a guess.)
4. Modify the phrase in SR 3.7.12.4 as indicated: "...can be maintained at a **pressure of** ≤ -6.35 mm (-0.25 inches) water gauge with respect to the adjacent areas..."
5. Change the 92 day completion time of generic TS 3.7.11 Required Action B.3 to 90 days, since the completion time of 90 days was the result of staff-industry negotiation approved in TSTF-448-A, Rev.3.

Response

1. The Note below the subsection title of Specification 3.7.11 is necessary to help understand that the control room HVAC system (CRHS) consists of two divisions of control room emergency makeup air cleaning system (CREACS) and control room supply and return system (CRSRS) since KHNP uses a combined Specification 3.7.11, CRHS which combines CREACS and CRSRS, whereas NUREG-1432 Rev.4 uses separate Specifications, 3.7.11 for control room emergency air cleanup system (CREACS) and 3.7.12 for control room emergency air temperature control system (CREATCS).

Regarding the Specification 3.7.11, KHNP submitted a response to RAI 120-7977, Question No. 16-24 (No.9) which states that KHNP will revise this Note to add "Each division of CREACS consists of one air cleaning unit (ACU) and each division of CRSRS consists of two air handling units (AHUs)." and will revise the LCO to "The CRHS shall be OPERABLE with : a Two CREACS divisions OPERABLE, and b. Two AHUs OPERABLE." to clarify the relationship of the AHUs to the OPERABILITY of CRSRS and CRHS. And KHNP also responded that Action will be revised to separate Condition A into Condition A and Condition B to address Condition A for inoperability of CREACS division and Condition B for inoperability of individual AHUs.

KHNP believes that the operating licensee can better understand and recognize the Conditions which do not meet the LCO for inoperability of CREACS or inoperability of AHUs and can implement the Required Actions efficiently by reading the Note below the subsection title of Specification 3.7.11.

Changes to the Specification 3.7.11 according to the response to RAI 120-7977, Question No. 16-24 (No.9) as well as the Note will be reflected in the next revision of the STS Deviation Report.

2. KHNP will revise TS 3.3.9 and 3.3.10, and the associated Bases for 3.3.9 and 3.3.10 to define "HVAC" where "HVAC" is used first in each Specification and Bases subsection. However, TS 3.7.11 and the associated Bases for 3.7.11 will not be revised to define "HVAC" since "HVAC" is used only in the subsection title.
3. As stated in the response of Question No.1, KHNP submitted a response to RAI 120-7977, Question No. 16-24 (No.9) which stated that KHNP will revise the LCO to "The

CRHS shall be OPERABLE with: a Two CREACS divisions OPERABLE, and b. Two AHUs OPERABLE.” The RAI response was reflected in the STS Deviation Report. However, there was a slight inconsistency in LCO 3.7.11.b between the STS Deviation report and the RAI response because there was a gap between the submittal date of STS Deviation Report and the submittal date of the RAI response. KHNP will delete “in two CRSRS divisions” from “b. Two AHUs in two CRSRS divisions OPERABLE” in the next revision of the STS Deviation Report to be fully consistent with the RAI response.

4. KHNP will revise SR 3.7.12.4 and the associated Bases for SR 3.7.12.4 to include “pressure of”.
5. KHNP will revise completion time of Required Action B.3 in TS 3.7.11 and the associated Bases for Required Action B.3 from 92 days to 90 days.

Impact on DCD

Same as changes described in Impact on Technical Specification section.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

TS 3.3.9, 3.3.10, 3.7.11, and 3.7.12 and the associated Bases for 3.3.9, 3.3.10, 3.7.11, and 3.7.12 will be revised as indicated in the attachment.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Report.

3.3 INSTRUMENTATION

3.3.9 Control Room Emergency Ventilation Actuation Signal (CREVAS)

LCO 3.3.9 One CREVAS channel shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4,
During CORE ALTERATIONS,
During movement of irradiated fuel assemblies.

ACTIONS		
CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CREVAS Manual Actuation, Actuation Logic, or required channels of radiation monitors inoperable in MODE 1, 2, 3, or 4.	A.1 Place one control room area HVAC system train in emergency operation mode.	1 hour
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 5.	36 hours

3.3 INSTRUMENTATION

3.3.10 Fuel Handling Area Emergency Ventilation Actuation Signal (FHEVAS)

LCO 3.3.10 One FHEVAS channel shall be OPERABLE.

APPLICABILITY: During movement of irradiated fuel in the fuel handling area.

ACTIONS		
CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Actuation Logic, Manual Actuation, radiation monitors channels inoperable.	A.1 Place one fuel handling area HVAC system train in emergency operation mode.	Immediately
	<u>OR</u> A.2 Suspend movement of irradiated fuel assemblies in fuel handling area.	Immediately

heating, ventilation, and air conditioning (HVAC)

3.7 PLANT SYSTEMS

3.7.11 Control Room HVAC System (CRHS)

NOTE

The CRHS consists of two divisions of control room emergency makeup air cleaning system (CREACS) and control room supply and return system (CRSRS).

LCO 3.7.11 Two CRHS divisions shall be OPERABLE.

NOTE

The control room envelope (CRE) boundary may be opened intermittently under administrative control.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6,
During movement of irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CRHS division inoperable for reasons other than Condition B.	A.1 Restore CRHS division to OPERABLE status.	7 days
B. One or two CREACS divisions inoperable due to inoperable CRE boundary in MODE 1, 2, 3, or 4.	B.1 Initiate action to implement mitigating actions.	Immediately
	<u>AND</u>	
	B.2 Verify mitigating actions to ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits.	24 hours
	<u>AND</u>	
	B.3 Restore CRE boundary to OPERABLE status.	92 days

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SURVEILLANCE REQUIREMENTS

SURVEILLANCE			FREQUENCY
SR 3.7.12.1	Operate each ABCAEES division for ≥ 15 minutes with heaters operating.		31 days
SR 3.7.12.2	Perform required ABCAEES filter testing in accordance with Ventilation Filter Testing Program (VFTP).		In accordance with VFTP
SR 3.7.12.3	Verify each ABCAEES division actuates on an actual or simulated actuation signal.		18 months
SR 3.7.12.4	Verify the mechanical penetration rooms and the safety-related mechanical equipment rooms can be maintained at a ≤ -6.35 mm (-0.25 inches) water gauge with respect to the adjacent areas using one division of ABCAEES during post accident mode of operation at a flow rate of $\leq 5,097$ cmh (3,000 cfm) within 300 seconds after a start signal.	pressure of	18 months on a STAGGERED TEST BASIS

BASES

BACKGROUND (continued)

One example of such a change in measurement error is drift during the surveillance interval. If the measured setpoint does not exceed the Allowable Value, the bistable is considered OPERABLE.

Setpoints in accordance with the allowable value will ensure that the main control room (MCR) dose is not violated during anticipated operational occurrences (AOOs) and the consequences of design basis accidents will be acceptable, providing the plant is operated from within the LCOs at the onset of the AOO or accident and the equipment functions as designed.

heating, ventilation, and air conditioning (HVAC)

APPLICABLE
SAFETY
ANALYSES

The CREVAS, in conjunction with the control room area HVAC System maintains the MCR atmosphere within conditions suitable for prolonged occupancy throughout the duration of any one of the accidents discussed in Reference 1. The radiation exposure of MCR personnel, through the duration of any one of the postulated accidents discussed in "Transient and Accident Analysis," DCD Tier 2, Chapter 15 (Reference 1), does not exceed the limits set by 10 CFR Part 50, Appendix A, GDC 19 (Reference 2).

The CREVAS satisfies the requirements of LCO SELECTION CRITERION 3.

LCO

LCO 3.3.9 requires one channel of CREVAS to be OPERABLE. The required channel consists of actuation logic, manual actuation, and gaseous radiation monitors. The specific Allowable Values for the setpoints of the CREVAS are listed in the SRs.

Operation with an actuation setpoint less conservative than the nominal actuation setpoint, but within its allowable value, is acceptable provided that the difference between the nominal actuation setpoint and the allowable value is equal to or greater than the drift allowance assumed for each actuation in the transient and accident analyses.

BASES

BACKGROUND (continued)

One example of such a change in measurement error is drift during the surveillance interval. If the measured setpoint does not exceed the Allowable Value, the bistable is considered OPERABLE.

Setpoints in accordance with the Allowable Value will ensure that Safety Limits are not violated during anticipated operational occurrences (AOOs) and the consequences of design basis accidents will be acceptable, providing the plant is operated from within the LCOs at the onset of the AOO or accident and the equipment functions as designed.

heating, ventilation, and air conditioning (HVAC)

APPLICABLE SAFETY ANALYSES

The FHEVAS is required to isolate the normal fuel handling area HVAC system and automatically initiate the recirculation and filtration systems in the event of the fuel handling accident in the fuel handling area, as described in Reference 2. The FHEVAS helps ensure acceptable consequences for the dropping of a spent fuel bundle breaching up to 60 fuel pins.

The FHEVAS satisfies the requirements of LCO SELECTION CRITERION 3.

LCO

LCO 3.3.10 requires one channels of FHEVAS to be OPERABLE. The required channel consists of actuation logic, manual actuation, and area radiation monitors. The specific Allowable Values for the setpoints of the FHEVAS are listed in the SRs.

Only the Allowable Values are specified for each actuation Function in the SRs. Operation with an actuation setpoint less conservative than the nominal actuation setpoint, but within its allowable value, is acceptable, provided that the difference between the nominal actuation setpoint and the Allowable Value is equal to or greater than the drift allowance assumed for each actuation in the transient and accident analyses.

Each allowable value specified is more conservative than the analytical limit assumed in the transient and accident analysis in order to account for instrument uncertainties appropriate to the actuation Function.

BASES

ACTIONS

A.1

With one CRHS division inoperable, for reasons other than an inoperable CRE boundary, action must be taken to restore OPERABLE status within 7 days. In this condition, the remaining OPERABLE CRHS division is adequate to maintain the control room temperature within limits and to perform the CRE occupants protection function. However, the overall reliability is reduced because a single failure in the OPERABLE division could result in less the CRHS function. The 7-day Completion Time is based on the low probability of a DBA occurring during this time period and the ability of the remaining division to provide the required capabilities.

B.1, B.2 and B.3

If the unfiltered leakage of potentially contaminated air past the CRE boundary and into the CRE can result in CRE occupant radiological dose greater than the calculated dose of the licensing basis analyses of DBA consequences (allowed to be up to 50 mSv whole body or its equivalent to any part of the body), or inadequate protection of CRE occupants from hazardous chemicals or smoke, the CRE boundary is inoperable.

Actions must be taken to restore an OPERABLE CRE boundary within 92 days.

During the period that the CRE boundary is considered inoperable, action must be initiated to implement mitigating actions to lessen the effect on CRE occupants from the potential hazards of a radiological or chemical event or challenge from the smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will ensure that CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that CRE occupants are protected from hazardous chemical and smoke. These mitigating actions (i.e., actions that are taken to offset the consequences of the inoperable CRE boundary) should be preplanned for implementation upon entry into the condition, regardless of whether entry is intentional or unintentional. The 24-hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period and the use of mitigating actions. The 92-day Completion Time is reasonable based on the determination that the mitigating actions will ensure protection of CRE occupants within analyzed limits while limiting the probability that CRE occupants will have to implement protective measures that could adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a DBA. In addition, the 92-day Completion Time is a reasonable time to diagnose, plan, and possibly repair and test most problems with the CRE boundary.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.12.4

The ABCAEES draws down and maintains the mechanical penetration rooms and the safety-related mechanical equipment rooms under a negative pressure with respect to adjacent areas. This SR verifies that the mechanical penetration rooms and the safety-related mechanical equipment rooms can be drawn down to at a ≤ -6.35 mm (-0.25 inches) water gauge with respect to the adjacent areas. This SR verifies the integrity of the mechanical penetration rooms and the safety-related mechanical equipment rooms enclosure. The ability of the mechanical penetration rooms and the safety-related mechanical equipment rooms to draw down and maintain a negative pressure with respect to adjacent areas is periodically tested to verify proper function of the ABCAEES. During the post-accident MODE of operation, each ABCAEES division is designed to draw down the mechanical penetration rooms and the safety-related mechanical equipment rooms to at a ≤ -6.35 mm (-0.25 inches) water gauge with respect to the adjacent areas within 300 seconds after a start signal and maintain a ≤ -6.35 mm (-0.25 inches) water gauge with respect to the adjacent areas at a flow rate of 5,097 cmh (3,000 cfm) to prevent unfiltered LEAKAGE.

pressure of

pressure of

pressure of

The ABCAEES is designed to maintain this negative pressure at a flow rate of less than or equal to 5,097 cmh (3,000 cfm) from the auxiliary building controlled area. The 18-month Frequency is based on the need to perform this Surveillance under the conditions that apply during unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. The 18-month Frequency is based on operating experience and design reliability of the equipment.

This test is conducted with the tests for filter penetration. An 18-month Frequency on a staggered test basis is consistent with other filtration SRs.

REFERENCES

1. DCD Tier 2, Subsection 6.5.1.
 2. DCD Tier 2, Subsection 9.4.5.
 3. DCD Tier 2, Subsection 15.6.5.
 4. NRC RG 1.52, Rev.4, September 2012.
 5. 10 CFR 50.34.
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